



FOREST PEST MANAGEMENT

Pacific Southwest Region

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3430 Evaluation
July 23, 1982

AN EVALUATION OF THE ILLINOIS SALE AREA, LA PORTE RANGER DISTRICT, PLUMAS NATIONAL FOREST

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ABSTRACT

The Illinois Sale area supports a second-growth stand of white fir with small components of ponderosa pine, sugar pine, Douglas-fir, and California black oak. The stand was logged in 1978 when the overstory sugar pines were removed. Stocking levels are high, with basal areas greater than 400 square feet per acre. Mortality of white fir occurs in small pockets in the stand. Many of the dead trees had been attacked by the fir engraver and annosus root disease was identified in some pockets. Mortality is a result of the interaction of insects, disease, overstocking, and some residual effects of the 1975-77 drought. Eventual conversion of the stand back to a plurality of pine would alleviate many of these problems.

INTRODUCTION

On June 14, 1982 we met with Mike Heath, Cleburne Smith, Ann Murphy, and Brad Seaburg of the La Porte Ranger District and visited the Illinois Sale area (T21N, R8E, section 20). There was concern about mortality of white fir in a 32-acre stand that was most recently logged of predominant sugar pine in 1978. The remaining stand is 80 percent second-growth white fir with a small component of ponderosa pine, sugar pine, Douglas-fir, and California black oak. The area had supported an old-growth stand of ponderosa and sugar pine. Stocking levels were greater than 400 square feet per acre in much of the stand.

OBSERVATIONS

Small pockets of white fir have been dying in the stand for the past several years following the 1975-77 drought. Exposing the wood surface of dead trees usually revealed that the fir engraver, Scolytus ventralis, had been present. Conks of Fomes annosus were found in the root systems of dead trees in some mortality centers.

BIOLOGIES OF PEST ORGANISMS

Fir Engraver (Scolytus ventralis): The fir engraver attacks white fir and most true firs in western North America. Attacks can result in a) mortality, b) top-kill, or c) patch kill along the bole in firs ranging from larger saplings to the over-mature. Mortality and top-kill frequently are associated with stress induced by overstocking, drought, root disease, soil compaction, excessive and sudden exposure, heavy dwarf and true mistletoe infections, and other factors limiting tree health and vigor. Because of the sporadic occurrence of widespread, severe mortality and top-kill, and the prevalence of healthy broods in living trees (patch attacks), direct control measures are generally impractical. A healthy, vigorously growing stand is the best means of minimizing losses.

Adults fly and attack trees on green fir slash between June and September; larvae, pupae and adults overwinter under the bark of infested trees. The life cycle takes one year, rarely two. Pitch tubes are not formed as with pine bark beetles, but attacks are often characterized by boring dust in bark crevices along the trunk and pitch streamers on the mid- and upper-bole. Trees successfully attacked early in the summer may exhibit fading of the foliage by early fall, but those attacked later in the year will not begin to fade until the following spring/summer. The beetles may have emerged by the time the tree fades.

Several other species of Scolytus, along with Pseudohylesinus, may be associated with the fir engraver. These contribute to the damage, but usually are not primary insects. The roundheaded fir borer, Tetropium abietis, also is a frequent associate.

Annosus Root Disease (Fomes annosus): Fomes annosus is a fungus that attacks a wide range of woody plants, causing a decay of the roots and lower bole and death of sapwood and cambium. All conifer species in California are susceptible to the fungus. Hardwood species are rarely damaged or killed. In some instances madrone (Arbutus menziesii) can be attacked. Infected pines are usually killed rather rapidly when the fungus girdles the root collar. Older true firs and incense-cedars usually survive infection for many years, although butt and root rot may become extensive resulting in tree weakening and windthrow.

During favorable periods, the fungus forms fruiting bodies in decayed stumps, under the bark of dead trees, or in the duff at the root collar. The fungus becomes established in freshly cut stumps from air-borne spores produced by the conks, and then grows into the root system. True fir can

probably also be infected by spores invading fresh basal wounds. The fungus subsequently spreads to healthy roots of surrounding susceptible tree species via root contacts. In general, infections will cross from pine to true firs; however, rarely is the fungus observed to go from true fir to pine. Local spread of the fungus outward from a stump typically results in the formation of disease centers, with dead trees in the center and fading trees on the margin. These centers usually continue to enlarge until they reach barriers such as openings or groups of nonsusceptible plants.

The fungus may remain alive for as long as 50 years as a saprophyte in infected roots and stumps. Young susceptible tree species often become infected and die after their roots contact old infected root systems in the soil.

MANAGEMENT ALTERNATIVES

1. Do Nothing. White fir mortality will continue around annosus root disease centers and throughout the stand because of high stocking levels. The fir engraver will likely be involved in much of this mortality. Some ponderosa pine mortality may also occur as a result of attacks by the western pine beetle, Dendroctonus brevicomis, if the trees are stressed through competition. Annosus root disease centers will regenerate principally with white fir, but the regeneration will be killed by the fungus before it approaches merchantable size.

2. Overstory Removal: Harvesting the overstory white fir and pine would reduce the basal area and alleviate some of the competition stress. Mortality levels in the stand would decrease somewhat for a few years, but would return to the present level or higher as stocking increased. The amount of mortality of white fir around annosus root disease centers would probably change little, if at all.

Damage to the residual understory white fir could be considerable because of logging activity and would result in a sizeable reduction of merchantable volume by the end of the rotation.

3. Overstory Removal/Precommercial Thinning. Thinning the residual stand in conjunction with an overstory removal would benefit the stand in several respects. First, more desirable stocking levels could be attained resulting in a reduction in competition, greater tree vigor and probably less mortality from fir engraver attacks. Second, firs around annosus root disease centers may survive longer because of their ability to grow an increased number of new roots, thereby compensating for the roots lost to root disease. Third, potential crop trees damaged during the logging activity could be removed as part of the precommercial thinning.

4. Species Conversion. At the time of the regeneration cut the stand could be artificially regenerated to pine. This would return the stand to a condition similar to the time before fire control. It would also reduce or eliminate the impact of annosus root disease since our observations indicate that Fomes annosus does not readily cross-over from infected fir to pine. Although both ponderosa and sugar pine are suitable to the site, the latter species should be limited to a minor component of the new stand. This is because of blister rust, caused by Cronartium ribicola, a disease capable of decimating young sugar pine plantations in a single season. Many of the sugar pines along the La Porte Road west of the stand had branch flagging, probably a result of infection by blister rust. This information, in addition to past surveys, indicates that blister rust is present and could become significant in the area.

Greenville A.D.
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REPLY TO: 3430 Evaluation

July 2, 1980

SUBJECT: Biological Evaluation on La Porte and Greenville
Ranger Districts

TO: Forest Supervisor, Plumas National Forest



At the request of Dick Castaldini, Plumas National Forest Silviculturist, John Kliejunas and Dave Schultz from the Forest Insect and Disease Management Staff and Chuck Richmond from the PSW Experiment Station visited the La Porte and Greenville Ranger Districts on June 16, 17 and 18 to examine a number of situations. One of the primary concerns on both districts was whether the current salvage sale marking guidelines were adequate.

OBSERVATIONS

La Porte Ranger District. Areas in, or near, the Hartman and Willow Creek sales on Hartman Bar Ridge were used to evaluate the current salvage sale marking guidelines. The primary tree species of concern was white fir. In many cases the stands in question were at, or past, maturity. The objective of the salvage marking was to mark all dead trees as well as those expected to die within two years, and to leave all trees expected to live more than two years for upcoming green sales. Some concern had been expressed that with the recent return to more normal precipitation, marking guidelines appropriate for the years during and just after the drought are now including too much green timber in salvage sales.

The primary guideline being used to select the trees which will probably die within two years is to mark those which have half or more of the crown dead. The guideline is basically sound because white fir trees that have had the crown killed down to a stem diameter of 6 inches or more have probably been attacked by the fir engraver, Scolytus ventralis. The remainder of the bole will most likely become infested with the fir engraver and/or the fir roundheaded borer, Tetropium abietis, within two years. On border-line trees, other signs of a current decline in the health of the tree such as an extreme loss of the older needles in the crown, or yellow-green foliage combined with a heavy cone crop indicate trees which are stressed enough to predispose them to bark beetle or borer attack.

Fir trees that have the top killed to a diameter of 6 inches or less, with the remainder of the tree appearing relatively healthy, probably

Jeffrey pine mortality - Greenville Ranger District. Approximately 10 to 12 scattered old growth Jeffrey pine were just fading along the upper part of Hungry Creek on the Greenville Ranger District. The trees had been attacked by the Jeffrey pine beetle, Dendroctonus jeffreyi, during 1979. Some of the beetles have already emerged and the remainder should emerge soon, but little additional mortality is expected because moisture conditions during the winter and spring were excellent.

Keddie Ridge Burn - Greenville Ranger District. On June 18, the sales in the burn on Keddie Ridge were examined for bark beetle activity. Trees in the burn were marked using Willis Wagener's "Guidelines for Estimating the Survival of Fire-Damaged Trees in California", however the guidelines were extended in the case of white fir to leave as many trees as possible. There is justifiable reason for concern over the survival of the trees because historically, Wagner's guidelines have been excellent for estimating survival. Scorched trees that die usually have bark beetles in them, but bark beetles have rarely built up in fire damaged timber and spread to adjacent healthy stands in California.

Attacks by the major bark beetles of pines such as the western pine beetle, mountain pine beetle and turpentine beetle are relatively easy to detect because a conspicuous pitch tube is produced. A number of ponderosa pine trees with basal pitch tubes from the turpentine beetle, Dendroctonus valens, and one sugar pine with mountain pine beetle, Dendroctonus ponderosae, pitch tubes were observed. Attacks by pine engravers, Ips spp., the fir engraver or roundheaded and flatheaded borers are much more difficult to detect without chopping into the tree. We did not chop into any of the leave trees, but a check of some of the standing timber designated for harvest showed only a few flatheaded borer larvae. In general, it appeared that most of the leave trees will survive for the immediate future, but it should be recognized that the fire damage will reduce the life expectancy of the scorched trees from what it would have been without the fire. After the leave trees have served their purpose (as seed trees or a shelterwood), the District should consider removing them within 10 years of the establishment of a new stand. In addition to providing tree seed, they will also serve as a source of dwarf mistletoe seed. Some of the leave trees are now at, or approaching, maturity and their age and condition suggests that they will not survive until the rotation age of the replacement stand, and may cause problems before that time.

If clarification of any of the points raised in this evaluation is necessary, please contact Dave Schultz, John Kliejunas or me at (415) 556-6520.

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